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The Files

28 February 1958

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Trip Report - [REDACTED]

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1. On 18 February 1958, a visit was made to the [REDACTED] in Alexandria, Virginia, to monitor the progress of RD-145, Task Order 1 - [REDACTED] Transmitter Development. Mr. [REDACTED] Project Engineer, exhibited the latest engineering models of our equipment and discussed with the writer the progress of the contract to date.

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2. Design of basic modules for the half-watt 3-30 mc CW transmitter has been completed. The complete system consists of two untuned oscillator modules (covering 3-7.5 and 7.5-15 mc), four 1-watt final modules, and four A antenna coupling modules (covering 3-6, 6-9, 9-15, and 15-30 mc), a side-tone oscillator and key. The contractor hopes to reduce from four to three the number of 1-watt final and antenna modules. The 1-watt final will be broadband and require no tuning, except for the 15-30 mc doubler/amplifier which will be both grid and plate tuned. Harmonic radiation from both the oscillator and the broadband final is, according to the contractor, well within our specification limits.

3. The latest 5-watt amplifier module using a 5763 delivers 6 watts to the antenna over most of the frequency range which it covers with three modules. Avion can reduce the size of this module by about a third (it is now $3\frac{1}{2}'' \times 2\frac{1}{2}'' \times 1\frac{1}{4}''$) by using a 5686 tube, which, besides being smaller, requires less than half the heater current of the 5763 (2.2 watt instead of 4.75). Finally, the 5686 is a preferred tube as well as MIL-spec while the 5763 is merely MIL spec. The price for going to the smaller, cooler tube, however, is that the minimum RF output at the antenna terminal would drop from 6 to 4.5 watts. Our present specification for antenna terminal output is, of course, 5 watts.

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4. [REDACTED] feels that the size of the [REDACTED] CW transmitter has now reached its practical minimum. Except for the 5-watt final and antenna coupling units, which are expected to shrink further, the transmitter size cannot be reduced without a proportional increase in the heat problem and more development effort in this phase than was originally programmed. [REDACTED] was told that its development program should be adhered to since the modules in question are now small enough to meet our requirements. The contractor was asked, however, to determine the size reduction in the side-tone and the

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RF oscillator modules if glass capacitors were used instead of the twelve silver micas in those two modules. If a significant reduction could be obtained without extensive redesign, the extra cost of glass capacitors (\$2.00 per unit compared to \$.50 for silver micas) might be justified.

5. Heat dissipation has become a major problem with the basic [redacted] power modules. For many months, the contractor has held out the hope that the heat sink called for in our original specification would not be necessary. The size of the module has shrunk so much, however, that there is insufficient metal mass to absorb the heat of tube filaments and normal plate dissipation. This heat, though generated at a low rate, climbs steadily to maximum of about 72°C surface temperature (at 20°C ambient) since the sealed modules provide no heat escape. It once again appears, therefore, that a heat sink will be necessary for the basic [redacted] modules. In the plug-together transmitter configuration, it is expected that the outside shell which contains the basic module, its controls, and interconnecting plugs will satisfactorily dissipate the heat generated by the transmitter. The contractor is now calculating the minimum surface area required in the plug-together modules, as well as the size of the heat sinks required for the basic modules.

6. In order to meet the size requirements of the [redacted] 25X1A2d2 project, [redacted] has developed a miniature variable capacitor with Teflon dielectric, measuring 1" x 3/4" x 1-1/4". It is a screw-adjustment pressure capacitor with a range of 3 to 300 micromicrofarads. Half-mil strip Teflon is now being used as the dielectric, but the contractor hopes to find a supplier who can band a thin layer of Teflon to stainless steel, for improved mechanical reliability.

7. The modulator will receive increased attention in the future, now that the design phase of the RF development is drawing to a close. A sizeable reduction in the size of the modulator modules will be possible with the advent of solid tantalum capacitors to replace the larger (and more expensive) liquid tantalum formerly used.

8. Mr. [redacted] Director of Engineering, says that his company's proposal for a companion receiver for [redacted] 5X1A2d2 and for a universal power supply for the half-watt and 5-watt transmitters would be delivered to us during the week of 24 February 1958.

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